A COMPARATIVE ANALYSIS OF SELECTEDPHYSIO-LOGICAL AND PHYSICAL VARIABLES BETWEEN TENNIS AND BADMINTON TRAINING PROGRAM SCHOOL LEVEL PLAYERS

SYNOPSIS SUBMITTED TO THE IIMT UNIVERSITYIN PARTIAR FULFILMENT OF REQUIREMENT FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY INPHYSICAL EDUCATION

SUBMITTED BY

SACHIN KUMAR TYAGI

SUPERVISED BY

Dr. Kanhaiya Kumar Singh

(Associate professor)

IIMT UNIVERSITY MEERUT

JUNE, 2021

1 INTRODUCTION

Badminton is a racquet sport played with a shuttlecock over a net. It has two variations singles and doubles. Casual matches are outdoors, while competitive games take place on indoor courts. The ultimate aim is to score points by landing the shuttlecock in the oppent's team's half of the court. It requires agility, precision, and quick reflexes.

Tennis is a racket sport played individually or in doubles. Players use racquets to hit a rubber ball over the net into the opponent's court. The goal is to prevent the opponent from returning the ball, earning points when they fail to do so. Effective training, guided by the FITT Principle (Frequency, Intensity, Time, and Type of Exercise), is crucial for enhancing athletic performance in various sports.

In the modern world, the focus on material gain and technology has led to neglecting spiritual, moral, and physical well-being. This shift has resulted in a rise in physical and mental health issues globally. Physical fitness is vital for a balanced life, enabling individuals to handle daily responsibilities and enjoy recreational activities with sufficient energy. Regular physical activities and exercise positively impact both physical health and emotional well-being, making it essential for people of all ages to prioritize fitness.

Motor fitness specifically pertains to an athlete's ability to excel in their chosen sport. It involves fundamental elements such as speed, strength, and explosive leg power, which are crucial for achieving optimallyperforming in racket sports like tennis and badminton. Definition of fitness is stated as a condition of well-being which empowers individuals to see, sense, and to do task at their top. It enables them to approach daily tasks with enthusiasm and alertness, while also possessing sufficient stamina to engage in leisure activities and effectively handle unexpected demands. Fitness serves as a fundamental foundation for good health and overall well-being, enabling individuals to endure and overcome stress in situations where an unfit person would struggle to continue.

2 RATIONAL OF STUDY

Driven by a strong passion for research and a background in exercise physiology, I have chosen this topic to address a significant gap in the existing studies. I am eager to design and conduct an experimental study that can provide valuable insights and contribute to the current body of research. Through empirical evidence, my primary goal is to bring meaningful contributions to the field.

3 REVIEWS OF RELATED LITERATURE

The literature review serves as a valuable resource for background knowledge and critical analysis of existing research on the subject. It aims to identify shortcomings, inconsistencies, connections to previous studies, and areas that require further investigation. Various sources, such as internet references, books, journals, periodicals, magazines, newspapers, and unpublished theses, were consulted to compile the relevant literature. The researcher diligently sought out literature that directly relates to the study at hand. Within this chapter, appropriate citations from multiple sources are provided to support the research. The researcher critically evaluates prominent academic works that are relevant to the subject matter. The objectives of the literature review are to establish a foundation for hypothesis development, provide supporting evidence, and broaden the overall context and understanding of the research. Ultimately, the review aims to bring readers up to date with the current state of knowledge on the subject.

This study looked at how internal and external focus attention instructions affected children's learning of the forehand-backhand drive, or tennis groundstroke. In all, 60 kids (30 boys and 30 girls) with ages ranging from 10.24 to 0.48 years were enrolled in the study. Three groups were randomly assigned to the children: the Control Group (CG), the Internal Focused Group (IFG), and the External Focused Group (EFG). One-way ANOVA findings ($p>0.05$) showed no significant difference between the three groups (EFG, IFG, and CG) in the pre-training tests of tennis skill (TST) and tennis transfer (TTT). Using a repeated-measures ANOVA analysis with three groups and three measurements, as well as TST and TTT, a significant interaction between the groups and measurements was found ($p < 0.01$). The post-hoc analysis revealed that the TTT did not substantially differ between the EFG and IFG, but both groups greatly improved when compared to the CG. Additionally, the TST results increased significantly in the EFG when compared to the IFG and CG.

Teaching kids to focus their attention on something outside of themselves makes it easier for them to acquire the fundamental tennis stroke known as the groundstroke (forehand-backhand) [1].

Michael J et al [2] evaluated the effects of the Badminton World Federation (BWF) Shuttle Time program on Saudi boys' and girls' physical fitness and fundamental movement skills (FMS) in both the short and long term (post to 10 weeks post). For six weeks, 76 youngsters between the ages of nine and eleven (44 boys and 32 girls) participated in twice-weekly Shuttle Time sessions. Their mean ± SD = 10.2 ± 0.9 years. The Test of Gross Motor Development 3 was used to measure FMS before, after, and ten weeks after the event. The 6 Minute Walk Test (6MWT), Standing Long Jump, Medicine Ball Throw, and 10 m Sprint Speed were used to measure physical fitness. FMS significantly improved for both boys and girls from pre to post ($p = 0.0001$) and post to 10-weeks post ($p = 0.0001$). The amount of FMS change in girls was noticeably higher. In the pre-10 weeks post domain, boys and girls showed substantial improvements in their 10 m sprint time, sitting medicine ball throw, standing long jump, and 6MWT performance (all $p = 0.001$). For females, the change in the seated medicine ball throw was greater before to 10 weeks post-test, whereas for boys, the change in the standing long jump and 6MWT was greater. Practically speaking, the BWF Shuttle Time program may be implemented in Saudi Arabia and helps to improve the fitness and FMS of 8–12-year-old Saudi youngsters.

Nara [4],undertook a study to compare the physical fitness levels of football and badminton players. The research sample included 150 Haryana residents who had represented their schools and colleges in state-level football and basketball championships. The AAPHER Physical Fitness Test was used by the researchers to assess the relevant characteristics. The obtained data was statistically analysed, including measurements such as the study's mean, standard deviation, and 't' Test. When compared to badminton players, football players performed better in the 50-yard sprint, according to the data.

Singh and Bhadu [5],conducted an examination on the anaerobic (oxygen-deprived)strength, agility, speed, and other anatomical measurements features of men'stable tennis and badminton players. The study included a sample of male participants aged 17 to 24 years old from the North Zone Intervarsity Tournament's

badminton and table tennis teams (n1=24; n2=24). To compare the two groups, the researchers used several methodologies such as monitoring player speeds over a 30-meter track and evaluating through the test namely Illinois Agility Test to measure agility.

Pawar[3], This research's goal was to examining to speed abilities of men's hockey players also for men's football in Pune. This study comprised 38 men, were athletes who had competed in the state tournament. These individuals, aged 14 to 16, were chosen from those who participated in the 10 District sports and events in Maharashtra in 2013-14. 50meters running test was used by the researchers for analysing the speed of both hockey and football players. The research's findings revealed that hockey players had lowquick reaction time than football players.

Dinesh T. and Gaur G.S. [6], The study aimed to investigate the effects of 06-week training of pranayama namely Kapal Bhatti regarding peak expiratory flow rates in healthy individuals. Significant improvements in pulmonary function were observed after the training. Additionally, a comparison between professional badminton and tennis players revealed differences in certain anthropometric characteristics, such as calf circumference, hip, and forearm measurements. These variations can be attributed to the specific movements and demands of each sport.

Robert D Chetlin[7],Resistance training, also known as weight training or strength training, has gained great popularity in recent years, largely due to its appeal and positive impact on many diverse populations, such as athletic, recreational and clinical communities. Resistance training has benefited young and old, men and women, both fit and not-so-fit.Additionally, several different types of training programs have been used with varying degrees of success – circuit training, forced reps, multiple set, single set, split routine – just to name a few. Of course, the issue frequently raised with so many different types of approaches ishow to choose an appropriate program for a given individual. Furthermore, trainees desire to know what new or innovative directions have been developed in the area of strength training. The truth is, developing a sound and effective resistance training program fora given individual can be a challenging task.

Kravitz, L. [8]. The study aimed to eleven college males who had completed a minimum of 11 weeks of a beginning resistance training program volunteered for the study. All subjects were quite familiar with the correct performance and safety techniques of the circuit training exercises. Choosing pretrained subjects allowed the researchers a better opportunity to test, observe and analyse the physiological effects of the circuit training protocol.

1.1. STATEMENT OF THE PROBLEM

A comparative analysis of selected physiological and physical variable between tennis and badminton training program school level players.

1.2. OBJECTIVE OF THE STUDY

1. To compare the effect of scientific training program on peak expiratory flow of school level badminton and tennis players.
2. To compare the effect of scientific training program on BMI of school level badminton and tennis players.
3. To compare the effect of scientific training program heart rate of school level badminton and tennis players.
4. To compare the effect of scientific training program on shoulder strength of school level badminton and tennis players.
5. To compare the effect of scientific training program on agility of school level badminton and tennis players.
6. To compare the effect of scientific training program on explosive leg strength of school level badminton and tennis players.
7. To compare the effect of scientific training program on speed of school level badminton and tennis players.

4 HYPOTHESES

The following hypotheses are proposed based on expert opinions, reviews, and the researcher's grasp of the situation and study findings:

1. It was hypothesized that there might be significant difference between comparative effect of training program on peak expiratory flow of school level badminton and tennis players.
2. It was hypothesized that there might be significant difference between comparative effect of training program on BMI (body mass index)of school level badminton and tennis players.

3. It was hypothesized that there might be significant difference between comparative effect of training program on heart rateof school level badminton and tennis players.
4. It was hypothesized that there might be significant difference between comparative effect of training program on explosive shoulder strengthof school level badminton and tennis players.
5. It was hypothesized that there might be significant difference between comparative effect of training program on agilityof school level badminton and tennis players.
6. It was hypothesized that there might be significant difference between comparative effect of training program on explosive leg strength of school level badminton and tennis players.
7. It was hypothesized that there might be significant difference between comparative effect of training program on speed of school level badminton and tennis players.

5 DELIMITATIONS

1. Only 100 school level players will be included in the study.
2. The study will only include youngsters aged between 12 to 15 years.
3. Also restricted to 12 weeks, will be the study's follow-up phase.
4. The factors under examination will be as follows:

- **PHYSIOLOGICAL VARIABLES**

BMI
Peak expiratory flow Rate
Heart rate

- **PHYSICAL VARIABLES**

Speed
Agility
Shoulder strength
Explosive strength (Legs)

6 LIMITATIONS

Individualised approach and habits and emotional moods of individuals, alsopsychologicaldisturbances and other conditions which includes factors and elementsthat may cause an impact on the study’s conclusions, which are not under

the control of the researcher, and may be deemed a research's shortcoming. Any bias resulting from participants' dishonest responses may be considered a study restriction.

7 DEFINITION AND EXPLANATION OF TERM

7.1. Peak expiratory flow rate (PEFR): Peak Expiratory Flow Rate (PEFR) is a measure of the maximum speed at which a person can exhale air forcefully and rapidly from their lungs. It is often used to assess the functioning of the respiratory system, particularly in individuals with asthma or other respiratory conditions. PEFR is measured in Liters per minute (L/min) and can help healthcare professionals monitor changes in lung function and the effectiveness of asthma management.

1.3. Body mass index (BMI):

Body mass index (BMI) is a numeric figure computed an individual's weight and height, used as an indicator of body fatness and potential health risks associated with excess weight. It is a commonly used method for classifying whether a person is underweight, normal weight, overweight, or obese.

7.3. Heart rate: Your heart's average rate of beating per minute is known as your heart rate (HR).

1.4. Shoulder strength:Shoulder strength refers to the physical capacity and muscular power of the shoulder to act against a resistance, which includes the muscles, tendons, ligaments, and bones that form the shoulder joint. This strength is essential for various upper body movements and activities, such as lifting, pushing, pulling, throwing, and carrying objects.

1.5. Agility:Agility involves the body's ability to move through a course or environment with precision and efficiency.

1.6. Speed: Speed is the measure of total distance travelled by the body in a specific period.

8.7. E**xplosive Strength(legs):**Explosive strength, also known as power or plyometric strength, widely accepted as a test of musclepower that reflects to the capability of a large muscle or group of combined muscles to developmost peak force in a very short period of time. In the context of legs, explosive strength specifically pertains to the ability of the leg muscles to produce a rapid and forceful contraction, enabling powerful movements like jumping, sprinting, and quick changes of direction.

8 SIGNIFICANCE OF THE STUDY

1. The results will assist in analysing the training program's efficacy.
2. To educate the sedentary population on the need of enrolling in a healthy living training plan.
3. People interested in physical education research may find this material incredibly useful.
4. The study's findings might help with the integration of tanning sessions into normal training routines.

9 RESEARCH METHODOLOGY

The primary focus of this study will be on the research methodology, which includes subject selection, variable selection, criteria measures, experimental design, test management, data collection, sample size determination, and the statistical analysis approach employed.

10 SELECTION OF THE SUBJECT

The study included 100 male tennis and badminton players, with 50 participants from each sport. Among them, 25 students were among theexperimental group and 25 among the control group, also the same number in the badminton group 25 in experimental and 25 in control group. The age range of the subjects was 12 to 15 years, selected from schools in Gurugram, Haryana, who played at the school level in both sports.

11 SELECTION OF VARIABLE

The examination will focus on selecting physiological and physical characteristics based on the literature that are drawn, also related to some extent on medical articles findings, also the specific objectives of the study.

PHYSIOLOGICAL VARIABLES	PHYSICAL VARIABLES
Heart Rate	Shoulder strength
Peak expiratory flow Rate	Agility
BMI	Speed
	Explosive strength (legs)

12 CRITERION MEASURES

Measurement Units and the List of Criteria:

MEASUREMENT CRITERIA			
Sl. No	**Variables**	**Equipment / Test**	**Unit**
1	BMI	Weighing machine and Anthropometric Rod	Kg/m2
2	Peak expiratory flow	Peak flow meter	Liters/Minute
3	Heart Rate	Sophisticated stop watch	Beats/minute
4	Shoulder strength	Medicine ball throw (3kg)	Meter
5	Agility	Zig-Zag Run (16*10) feet	Minute
6	Speed	50 metres Sprint	Meter/ second
7	Explosive Strength (legs)	Standing broad Jump	Meter

13 EXPERIMENTAL DESIGN

The design for the particular study will be based on comparison between group. The training-based design which has experimental input will be given to groups in a randomly dividing manner. The data from the groups that will undergo in

gathered form prior to the training session (pre-test) and after Twelve weeks afterwards (post-test).

14 STATISTICAL TECHNIQUES

The statistics technique, ANCOVA will be used for the present research will be the statistical method to identify or evaluate the impact of treatment programme within groups on specified physicallyand physiologicallyvariables. The confidence level will be set at 0.05 level of significances. Calculations will also be made for descriptive statistics like mean and standard deviation. The application SPSS-20 will be used for data analysis.

15 Bibliography

[1]. Tapan T, Şahan A and Erman KA (2023) The effect of internal and external focus of attention on tennis skill acquisition in children. *Front. Psychol*. 14:1308244. doi: 10.3389/fpsyg.2023.1308244.

[2]. Duncan, Michael J., Abdulrahman AlShabeb, Katie Fitton Davies, Nadia Alshahrani, and Yazeed Almasoud. 2023. "A 6-Week Badminton-Based Movement Intervention Enhances Fundamental Movement Skills and Physical Fitness in Saudi Boys and Girls" Sports 11, no. 7: 132. https://doi.org/10.3390/sports11070132

[3]. Vishal subhashpawar (2016). ''A study of speed ability among football and hockey male players of Pune Maharashtra'' P-ISSN: 2394-1685 E-ISSN: 2394-1693 Impact Factor (ISRA): 5.38 IJPESH 2016; 3(6): 325-326 © 2016 IJPESH www.kheljournal.com Received: 24-09-2016 Accepted: 25-10-2016

[4]. Kuldeep Nara (2016) A study of physical fitness between basketball and football players of Haryana ISSN: 2456-0057 IJPNPE 2017; 2(1): 01-04 © 2017 IJPESH www.journalofsports.com Received: 01-11-2016 Accepted: 02-12-2016

[5]. Bhadu, A. P., & Singh, P. (2016). Comparison of speed, agility, anaerobic strength and anthropometric characteristics in male basketball and handball players. *Int. J. Phys. Educ. Sports Health*, *3*, 265-267.

[6]. Dinesh, T., Gaur, G. S., Sharma, V. K., Madanmohan, H. K. K., & Grrishma, B. (2013). Effect of 6 weeks of Kapalabhati Pranayama training on peak expiratory flow rate in young, healthy, volunteers. SchAcad J Biosci, 1(4), 111-114.

[7]. Robert, D. C. (2002). Resistance Training-Contemporary Issues in Resistance Training: What Works. Fit Society, American College of Sports Medicine, 3.

[8]. Kravitz, L. (2006). The fitness professional's complete guide to circuits and interval. Age, 56, 1.